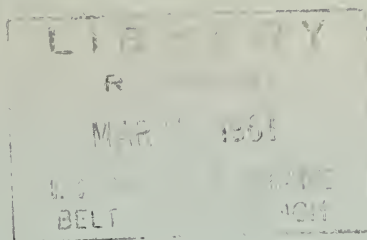


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

A423.9
R31
81-8
cop-1



ARS 81-8
U S D A
FEB. 1961

the Use of MILKY DISEASE for Japanese Beetle Grub Control

An effective method for control of Japanese beetles is the use of bacterial disease that kills the grubs, the young of the beetles. Two disease organisms, *Bacillus popilliae* Dutky and *B. lentimorbus* Dutky, infect the Japanese beetle grubs, causing their normally clear blood to appear milky--hence the name milky disease. Preparations containing these two bacteria are available from garden supply houses.

The disease organisms affect only the Japanese beetle grubs and a few related insects, and do not harm earthworms. The bacteria do not affect birds, domestic or wild animals, or humans. Once the organisms are established, birds and animals which eat infected grubs or soil help to carry the disease to new areas thus assisting in control of the Japanese beetles.

The spores remain alive in the soil for long periods, ready to infect and kill a high percentage of successive generations of Japanese beetle grubs as they move about in the soil and feed on the roots of plants and organic material.

The milky disease bacteria normally occur in the soil as spores. These spores are highly resistant to drying, to excessive moisture, and to extreme

temperatures. They are not affected by passing through the digestive tracts of earthworms or warm-blooded animals. The disease was first discovered in this country where the Japanese beetles had been established for a long period.

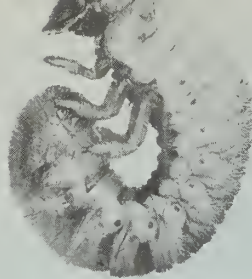
To produce a commercial product, manufacturers collect grubs and inoculate them with the disease to obtain billions of spores that are produced in the grubs. These grubs are then used to prepare mixtures that the home owners and others can distribute over the soil or in sod and lawns to kill Japanese beetle grubs.

HABITS OF THE JAPANESE BEETLES

The beetles emerge from the soil in late spring or early summer and feed on a large variety of flowers, vegetables, trees, and weeds. Their feeding causes leaves to have a lacy appearance. Eggs are laid 2 to 6 inches deep in the soil. Grubs hatching from the eggs are C-shaped and reach a length of 1/2 to 3/4 of an inch by fall. They feed on vegetable matter in the soil at first but later they feed

Applying the milky disease.

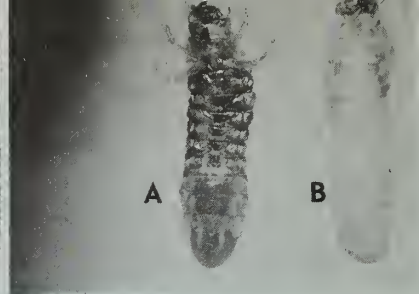




A grub much enlarged.



Grubs under turf.



Grubs: A, Normal; B, diseased.

on the fine roots of plants--particularly of the grasses. They often kill patches of lawns and other turf. The grubs overwinter and emerge as beetles the next season. There is only one generation a year.

HOW TO USE MILKY DISEASE

Since the milky disease works only on the grubs in the soil, community action is more effective than treatment of a single home site; otherwise, beetles from adjacent sites may fly into treated areas. Single site treatment, however, will protect grasses against serious damage by the grubs.

The spore dust may be applied by spot treatment or broadcast over the turf at any time when the ground is not frozen but is best applied in spring or fall. For spot treatment of small areas, about 1 level teaspoonful of spore dust is applied at 3-foot intervals in rows 3 feet apart. For a less expensive treatment, the interval may be increased to 5-foot or even 10-foot intervals, but usually less time is required for the disease to become effective when 3-foot spacing is used.

For spot treating 1 acre or more, an ordinary hand-operated corn planter with a rotary disk seeder may be used. The planter can be adjusted to deliver about 1 level teaspoonful of spore dust each time it is tripped. Using a corn seeder, about 21 pounds of spore dust will be required to treat 1 acre at 3-foot

intervals; about 8 pounds per acre for 5-foot intervals; and 2 pounds per acre for the 10-foot intervals.

The spore dust may be broadcast over the turf either by hand or by a garden type fertilizer spreader. No less than 20 pounds of spore dust should be used on each acre. The dust should be mixed with several times its volume of topsoil, sand, or commercial fertilizer.

One treatment of grub-infested turf with spore dust will usually insure establishment of milky disease. Several seasons may be required before the disease reaches its greatest effectiveness. A reduction in grubs and less injury to sod will be noticed first in the treated areas. The milky disease will gradually spread into adjacent untreated soil.

SHOULD YOU USE INSECTICIDES?

Milky disease spores may not act rapidly enough in some instances to prevent serious damage to turf or lawns when grub infestations are heavy. In these instances, DDT, chlordane, heptachlor, or other insecticides may be applied to the soil or turf to kill the grubs. Also, since the milky spore acts only on the grubs, it may be necessary to protect the above-ground parts of plants from attacks by the beetles. A number of insecticides are available at your garden supply house for this purpose. When insecticides are used, all directions and precautions for use must be followed carefully.

Information supplied by the Plant Pest Control Division
AGRICULTURAL RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE



Growth Through Agricultural Progress